IN THE CLAIMS

Please amend Claim 18, to read as follows.

1. (Previously Presented) A liquid discharge head comprising:

a discharge energy generating element for generating energy for discharging a liquid droplet;

an element substrate having a main surface on which said discharge energy generating element is provided;

a discharge port portion having a discharge port for discharging the liquid droplet;

a nozzle having a bubbling chamber in which a bubble is generated in liquid by said discharge energy generating element and a supply path for supplying the liquid to said bubbling chamber;

a supply chamber for supplying the liquid to said nozzle; and

an orifice substrate joined to the main surface of said element substrate, wherein

said bubbling chamber includes a first bubbling chamber which communicates with said supply path and uses a portion of the main surface of said element substrate as a bottom surface of said first bubbling chamber and in which the bubble is generated in the liquid by said discharge energy generating element and a second bubbling chamber communicating with said first bubbling chamber,

said second bubbling chamber communicates with said discharge port portion,

a central axis of a lower surface of said second bubbling chamber extending through a center of said lower surface of said second bubbling chamber in a direction

perpendicular to said substrate coincides with a central axis of an upper surface of said second bubbling chamber extending through a center of said upper surface of said second bubbling chamber in a direction perpendicular to said substrate,

a cross-sectional area of said upper surface with respect to a central axis of said second bubbling chamber extending through the center of said second bubbling chamber in a direction perpendicular to said substrate is smaller than a cross-sectional area of said lower surface with respect to the central axis of said second bubbling chamber,

a cross-sectional area of said second bubbling chamber with respect to the central axis of said second bubbling chamber changes continuously from said lower surface to said upper surface of said second bubbling chamber, such that a side wall surface of said second bubbling chamber has an inclination of 10 to 45 degrees with respect to a plane perpendicular to the main surface of said element substrate, and

the cross-sectional area of said upper surface with respect to the central axis of said second bubbling chamber is greater than a cross-sectional area of said discharge port portion with respect to a central axis of said discharge port portion.

2. (Canceled)

3. (Previously Presented) A liquid discharge head according to claim 1, further comprising plural nozzles, wherein said first bubbling chamber is enclosed, in three directions, by nozzle walls for partitioning said plural nozzles arranged in parallel to form individual nozzles and,

a wall surface of said discharge port portion is parallel with a line perpendicular to the main surface of said element substrate.

4. (Previously Presented) A liquid discharge head according to claim 1, further comprising plural nozzles, wherein said first bubbling chamber is enclosed, in three directions, by nozzle walls for partitioning said plural nozzles arranged in parallel to form individual nozzles and,

a wall surface of said discharge port portion has a taper of less than 10° with respect to a plane perpendicular to the main surface of said element substrate.

5. (Previously Presented) A liquid discharge head according to claim 1, wherein an upper surface of said supply path parallel with the main surface of said element substrate near said supply chamber is higher than an upper surface of said supply path contiguous to and flush with an upper surface of said first bubbling chamber and is connected to the latter upper surface via a stepped portion, and

a maximum height of said supply path from the main surface of said element substrate to the former upper surface is smaller than a height from the main surface of said element substrate to the upper surface of said second bubbling chamber.

6. (Previously Presented) A liquid discharge head according to claim 1, wherein a height of said supply path in a plane perpendicular to a flowing direction of the liquid is changed in a thickness direction of said orifice substrate in a vicinity of a stepped portion that

connects (a) an upper surface of said supply path parallel with the main surface of said element substrate near said supply chamber with (b) an upper surface of said supply path contiguous to and flush with an upper surface of said first bubbling chamber.

7. (Previously Presented) A liquid discharge head according to claim 1, wherein said nozzle is designed so that a cross-sectional area of a flow path extending from said discharge port to said supply chamber is changed with plural stages.

8. (Previously Presented) A liquid discharge head according to claim 1, wherein said nozzle is formed so that a discharging direction along which the liquid droplet is ejected from said discharge port is perpendicular to a flowing direction of the liquid flowing in said supply path.

9. (Previously Presented) A liquid discharge head according to claim 1, wherein said nozzle is formed so that the sum of volumes of said first bubbling chamber, said second bubbling chamber and said discharge port portion is smaller than a volume of said supply path.

10. (Previously Presented) A liquid discharge head according to claim 1, wherein the bubble generated by said discharge energy generating element communicates with the atmosphere during the discharging.

11. (Previously Presented) A liquid discharge head according to claim 1, wherein said orifice substrate is provided with plural nozzles and plural discharge energy generating elements corresponding thereto, respectively, said plural nozzles are divided into a first nozzle array and a second nozzle array which is disposed at a position opposed to said first nozzle array, with said supply chamber being interposed between said first and second nozzle arrays, longitudinal directions of the nozzles in said first nozzle array are parallel, and longitudinal directions of the nozzles in said second nozzle array are parallel, and

longitudinal central axes of said nozzles in said second nozzle array are disposed so as to be offset by 1/2 pitch with respect to longitudinal central axes of adjacent ones of said nozzles in said first nozzle array.

12. (Previously Presented) A method for manufacturing a liquid discharge head comprising a discharge energy generating element for generating energy for discharging a liquid droplet, an element substrate having a main surface on which said discharge energy generating element is provided, a discharge port portion having a discharge port for discharging the liquid droplet, a nozzle having a bubbling chamber in which a bubble is generated in liquid by said discharge energy generating element and a supply path for supplying the liquid to said bubbling chamber, a supply chamber for supplying the liquid to said nozzle and an orifice substrate joined to the main surface of said element substrate, said bubbling chamber comprising (a) a first bubbling chamber that communicates with said supply path and uses a portion of the main surface of said element substrate as a bottom surface of said first bubbling chamber and in which the bubble is generated in the liquid by said discharge energy generating element and (b) a

second bubbling chamber communicating with said first bubbling chamber and with said discharge port portion, the method comprising the steps of:

coating a thermal bridge type organic resin soluble by solvent and adapted to form a pattern for said first bubbling chamber and a lower portion of said supply path on said element substrate having the main surface on which said discharge energy generating element is provided and heating the resin to form a thermal bridge film;

coating an organic resin soluble by solvent and adapted to form a pattern for said second bubbling chamber and an upper portion of said supply path on said thermal bridge film so as to form a two-layer soluble film;

exposing and developing the organic resin by using near-UV light having a wavelength of 260 to 330 nm in order to form the pattern for said second bubbling chamber and the upper portion of said supply path;

forming an inclination of 10 to 45 degrees on a side surface of the organic resin by heating the exposed, developed and pattern-formed organic resin at a temperature lower than a glass transition point;

exposing and developing said thermal bridge film by using deep-UV light having a wavelength of 210 to 330 nm;

laminating said orifice substrate having the discharge port by coating, exposing, developing and heating a negative type organic resin on a flow path pattern formed by the two-layer soluble film; and

forming said discharge port portion for discharging the liquid droplet, said nozzle having said bubbling chamber in which the bubble is generated in the liquid by said discharge

energy generating element and said supply path for supplying the liquid to said bubbling chamber, said supply chamber for supplying the liquid to said nozzle and said orifice substrate joined to the main surface of said element substrate, by illuminating deep-UV light onto said negative type organic resin thereby to remove the two-layer soluble film.

13. (Previously Presented) A method according to claim 12, wherein said second bubbling chamber and the upper portion of said supply path are formed by pattern transferring, by using a photo-mask in which a pattern of said second bubbling chamber is a normal resolving power pattern of the organic resin and a pattern of the upper portion of said supply path is a pattern smaller than a limited resolving power of the organic resin, and by using near-UV light having a wavelength of 260 to 330 nm.

14. (Previously Presented) A method according to claim 12, wherein, in said exposing and developing step of the organic resin, said second bubbling chamber and the upper portion of said supply path are divided into an area where the resin is removed completely, an area where the resin is removed partially and an area where the resin is not removed at all.

15. (Original) A method according to claim 14, wherein, in said exposing and developing step of the organic resin, said area where the resin is not removed at all forms said second bubbling chamber and said area where the resin is removed partially forms the upper portion of said supply path.

16. (Previously Presented) A method according to claim 12, wherein a height of said first bubbling chamber on said element substrate is 5 to 20 μm and a side wall of said first bubbling chamber is formed with an inclination of 0 to 10° with respect to a plane perpendicular to the main surface of said element substrate.

17. (Previously Presented) A method according to claim 12, wherein the thermal bridge type organic resin for forming said first bubbling chamber and the lower portion of said supply path comprises methyl methacrylate and is formed by dissolving material obtained by being copolymerized with methacrylic acid and methacrylic acid ester in a coating solvent.

18. (Currently Amended) A ink jet recording head comprising:

an element substrate having a main surface on which a discharge energy generating element for generating energy for discharging a liquid droplet is provided;

a discharge port portion having a discharge port at one end thereof, the discharge port being opposed to said discharge energy generating element;

a supply path for supplying liquid to said discharge port portion;

a first bubbling chamber using a portion of the main surface of said element substrate as a bottom surface and communicating with said supply path, a bubble being generated in liquid in the first bubbling chamber by said discharge energy generating element; and

a second bubbling chamber having one end portion communicating with said first bubbling chamber and another end portion communicating with another end of said discharge port portion,

wherein a cross-sectional area of said first bubbling chamber, taken in a plane parallel to the main surface of said element substrate, is larger than a cross-sectional area of said second bubbling chamber, taken in [[the]] a plane parallel to the main surface of said element substrate, and the cross-sectional area of said second bubbling chamber, taken in the plane parallel to the main surface of said element substrate, is larger than a cross-sectional area of said discharge port portion, taken in a plane parallel to the main surface of said element substrate,

wherein each of (a) a connecting portion between a side wall surface of said first bubbling chamber and a side wall surface of said second bubbling chamber and (b) a connecting portion between a side wall surface of said second bubbling chamber and a side wall surface of said discharge port portion has a stepped portion,

wherein the side wall surface of said second bubbling chamber has a tapered shape such that an end portion of the side wall surface of said second bubbling chamber at the discharge port portion is smaller than an end portion of the side wall surface of said second bubbling chamber at said first bubbling chamber.

19. (Previously Presented) An ink jet recording head according to Claim 18, wherein the side wall surface of said discharge port portion has a tapered shape so that an end portion of the side wall surface at a side of said discharge port is smaller than an end portion of the side wall surface at a side of said second bubbling chamber side.

20. (Previously Presented) An ink jet recording head according to Claim 18, wherein the side wall surface of said second bubbling chamber is formed with an inclination of

10 to 45 degrees with respect to a plane perpendicular to the main surface of said element substrate.

21. (Previously Presented) An ink jet recording head according to Claim 19, wherein the side wall surface of said discharge port portion is formed with an inclination of 10 to 45 degrees with respect to a plane perpendicular to the main surface of said element substrate.